



The
Imperial Forestry Institute
University of Oxford

FOURTEENTH ANNUAL REPORT

1937—38

Oxford
THE HOLYWELL PRESS, LTD.

1938



The
Imperial Forestry Institute
University of Oxford

FOURTEENTH ANNUAL REPORT

1937—38

Oxford
THE HOLYWELL PRESS, LTD.

1938

COMMITTEE FOR THE IMPERIAL FORESTRY
INSTITUTE.

(As at date of report.)

SIR E. FARQUHAR BUZZARD, BT., K.C.V.O. (*Chairman*).

SIR JAMES IRVINE, C.B.E., F.R.S. (*Vice-Chairman*).

PROFESSOR R. S. TROUP, C.M.G., C.I.E., F.R.S.

MR. C. G. T. MORISON, Student of Christ Church.

MAJOR R. D. FURSE, C.M.G., D.S.O., Colonial Office.

SIR GERALD TREVOR, C.I.E., India Office.

SIR ALEXANDER RODGER, O.B.E., Forestry Commission.

MR. THOMAS THOMSON, University College of North Wales,
Bangor.

MR. J. N. OLIPHANT (*Secretary*).

UNIVERSITY OF OXFORD

FOURTEENTH ANNUAL REPORT OF THE IMPERIAL FORESTRY INSTITUTE

ACADEMIC YEAR, 1937—38

INTRODUCTION.

1. Since last year's report was issued, certain important changes in the constitution and functions of the Institute have been decided upon, and it is desirable that the report for this year should be prefaced by a brief explanation of the nature of these changes, and of the considerations that have led to their adoption by the University. The following statement on the subject has accordingly been authorized by the University Committee for Forestry:—

'The future of forestry at Oxford has for some time past been under consideration by the University authorities in consultation with the chief contributors to the support of the Imperial Forestry Institute, and it is now possible to give an outline of the plans that have been decided upon and of the future policy to be pursued.

'From the educational standpoint, the most important feature of these plans is the decision to merge the Institute and School of Forestry in a single organization, a process which will begin to take effect from August 1st, 1939. The functions of this organization are to include the teaching of forestry *ab initio* to graduates in other subjects who have been selected by the Colonial Office for the Forestry Scholarships referred to below, and to students working for a degree in forestry. For the latter, who must have taken honours either in an approved Final School at Oxford or elsewhere, or in Science Moderations at Oxford, there will be a degree examination. The course of instruction for both categories will normally extend over two years, and in the case of the Colonial Forestry Scholars these two years will be taken separately with a period of practical experience between. The three-year undergraduate course at present given at the School of Forestry will be discontinued when those now undergoing it have completed their studies.

'The courses hitherto arranged by the Institute for members of the Government forest services on leave and others will be maintained, as will also the courses for graduates from the Schools of Forestry appointed on probation to those services. The devolution of fundamental studies referred to in the next paragraph should enable the demand for specialized courses for serving officers to be more effectively met than heretofore. Studies for the Diploma of Forestry will remain on substantially the same footing except that entry will be limited to holders of a degree in forestry or equivalent qualification.

'The Institute, as thus reconstituted, will have the status of a University Department, with the University Professor of Forestry at its head, and the post of Director will disappear. The savings consequent on the discontinuance of the School of Forestry as a separate entity will be applied by the University in strengthening both the Department of Forestry and other departments whose work has a special bearing on forestry; and the devolution, in some measure, of fundamental studies on those departments will enable the Institute to devote its resources to a greater extent than has hitherto been possible to forestry proper and the applications of science in forestry.

'The service of information, which it was contemplated from the outset that the Institute should provide, but which could never be properly organized for lack of adequate funds, will be supplied by a separate Imperial Forestry Bureau to be set up under the Imperial Agricultural Bureaux organization. This will be independent of the University, but liaison will be secured by placing the head of the Institute in general control of the Bureau with the title of Director: a Deputy Director will be in executive charge. The function of the Bureau will be to examine the forestry literature of the world and present its more important contents in assimilable form for the information of those engaged in the practice or study of forestry, and the resources of the University forest library will be at its disposal for this purpose.

'The provision made in these new arrangements for the study of forestry as a post-graduate subject is mainly to meet the wish of the Colonial Office that an alternative channel of recruitment to the Colonial Forest Service should be opened up by way of what is known as the Scholarship Scheme. This entails the grant of scholarships to selected candidates who have graduated with honours, normally in those natural sciences, such as botany, which are ancillary to forestry, to enable them to undergo a course of training in forestry extending over a period of two years: the period may be longer in the case of scholars whose previous education has not equipped them with sufficient knowledge of the ancillary sciences to provide a satisfactory basis for the training.

'The Scholarship Scheme was adumbrated in the Report of the Irvine Committee in 1931,¹ but financial considerations precluded its being given immediate effect. With the support of Sir James Irvine, and the general concurrence of the Colonial Governments concerned, it has been somewhat modified from its original form, notably by a provision whereby the two years of training will be divided by an interval of practical experience (the "apprentice tour") spent in the forest department of the Colony to which the scholar is to be appointed. The Colonial Office has been encouraged to proceed with this scheme by the satisfactory results of parallel schemes of recruitment for the Colonial Agricultural and Veterinary Services, and is impressed with the need for securing in recruits for the Colonial Forest Service also an educational standard comparable with that attained by entrants to the Administrative Service. The University authorities, on their part, are satisfied after close examination of this scheme that the proposed method of training is practicable.

'The usefulness of this form of training need not be restricted to the Colonies: it has distinct advantages and has long been advocated. The history of British forestry education shows early evidence of a desire for a strengthening of the educational basis on which professional training in forestry is superimposed. This first manifested itself in 1912, when India adopted the system of selecting graduates with honours in Natural Science to undergo two years training in forestry: a plan that may be regarded as the prototype of the present Colonial Scholarship Scheme. At the Empire Forestry Conference of 1920,² when the scheme for the setting up of a central training institution first took shape, opinion was "unanimously in favour of selection from the science schools of the Universities at the post-graduate stage," followed by a course of forestry training at a central institute of at least two years' duration and financed on a scholarship basis. Opposition that developed subsequently led to the rejection of these proposals by an Inter-departmental Committee in 1921³ in favour of a system whereby graduates from the Schools of Forestry were to be given a one-year "finishing" course at the central institute to supplement the three-year training given at those schools. The selection for training of graduates with honours in Natural Science was commended by that Committee in principle, but rendered nugatory

¹ 'The training of candidates and probationers for appointment as forest officers in the Government service.' Report of a Committee appointed by the Secretary of State for the Colonies, July, 1931. Colonial No. 61. H.M. Stationery Office, 1931.

² British Empire Forestry Conference, London, 1920. Proceedings, resolutions and summary of statements. H.M. Stationery Office, 1931.

³ Report of the Interdepartmental Committee on Imperial Forestry Education. Cmd. 1166. H.M. Stationery Office, 1921.

in practice by the recommendation that such entrants should undergo two years' training at an undergraduate School of Forestry followed by a final year at the central institution: a system that would have involved their spending an aggregate of at least six years at a University.

'It is interesting and significant to find the Irvine Committee, likewise an inter-departmental body, reverting to the solution rejected by its predecessor ten years earlier; a solution that the University authorities who have examined the question feel satisfied is the right one. They believe that it is not possible, within the limits of a three-year undergraduate course, to make adequate provision for both the Forestry subjects and the fundamental studies which should precede, and form the basis for, the professional training of a fully qualified forest officer. They query the suggestion, implicit in the main finding of the Inter-departmental Committee of 1921, that the deficiency in such studies inevitable in an undergraduate training of only three years' duration can be satisfactorily supplied in a subsequent year of post-graduate study: an expedient that has been likened to an attempt to compensate for weakness in the foundations of a building by adding masonry in the roof. The minimum standard required in such studies should, in their opinion, be that of honours in Science Moderations: hence the decision to limit undergraduate training in future to such private students possessing this qualification as may wish to enter for the two-year forestry course.

'Provided that a good grounding in the fundamentals is given at the outset, knowledge of applied forestry can be enlarged almost indefinitely by recurrent periods of study undertaken at intervals during service, and one of the recognized functions of the Institute is to provide such cumulative training. It is desirable that the impression should be dispelled, in so far as it still persists, that the initial course of training can equip a man comprehensively for a vocation so many-sided as forestry has now become.

'On the somewhat controversial question of the extent to which the forest services should recruit and train honours graduates it is not for the University to express a definite opinion. The functions of forest officers vary within wide limits, and the answer must depend largely on the nature of the duties that the trained forest officer is to be called upon to perform. The Dominions, India and Burma are no longer recruiting their forest services to a material extent from the United Kingdom, and their interest in the question of primary training is unlikely to extend beyond the possibility of sending science graduates from their own universities to the Institute for post-graduate instruction in forestry. The Colonies, however, are more closely affected and, having regard to the ever-increasing complexity

of the problems with which their forest departments are confronted, there can be little doubt as to the wisdom of the course that the Colonial Office propose to follow in filling a proportion of their vacancies with graduates from the science schools and arranging for their post-graduate training in forestry.

'At all events, with the coming into effect of the new arrangements, facilities will be available for every type of forestry training that is likely to be in demand. Post-graduate instruction will predominate at Oxford, as the training of undergraduate entrants who have taken honours in Science Moderations will be assimilated as closely as possible to that of their fellow-students with graduate qualifications; while the undergraduate courses given at other Universities should provide ample facilities for training on traditional lines.

'The changes in contemplation have been described above in outline: the details have been fully worked out, but their discussion may be postponed until further progress has been made in putting the plan into effect. As has been made clear, the changes are not of a novel or revolutionary character but give effect to former proposals that received wide support from the forest authorities of the Empire at the time when they were made: they represent the climax of a movement begun a quarter of a century ago. In other respects, no departure is contemplated from the general policy laid down for the Institute in Part I of the Annual Report for 1935-36.'

GENERAL.

2. Only two post-graduate probationers underwent training during the year, both of whom had service experience, one in Trinidad and the other in Uganda. The small number is due to the transition, referred to in paragraph 5 of last year's report, to a system of sending Colonial Forest Service probationers to their colonies, directly after graduation, for a period of practical experience before they undergo their final year of post-graduate training. This arrangement promises to be very much more satisfactory than the original plan whereby the fourth year of training immediately followed the three-year undergraduate course.

3. Attendance by forest officers from different territories for refresher or special courses of varying length was as follows:—

British Honduras	1
Gold Coast	1
Malaya	3
Mauritius	1
Nigeria	2
Northern Rhodesia	2
Tanganyika	1
Punjab	1
	—
Total	12
	—

This total compares with thirteen last year, and an average of nine for the five years ended 1936-37.

4. No tour on the Continent was undertaken during the year. One refresher course student from India accompanied the School of Forestry tours, and another from Malaya returned to his territory *via* the United States and Japan, in which countries he was enabled to visit forestry centres and to see some forestry work in the field.

5. The Director, Dr. Chalk and Mr. Day, accompanied by three students, visited East Malling Research Station in June, 1938. The research work seen was of great interest, and included the injection of chemicals into trees to supply mineral deficiencies, experiments on available soil moisture, the study of root action, and methods of artificial propagation.

6. The customary excursions to study soils, with Mr. Clarke of the Soil Science Laboratory, and utilization, with Mr. Lloyd, were made during the Trinity Term.

7. Lectures given by visiting officers and others are shown in chronological order in the following list:—

Mr. A. V. Thomas, Officer-in-Charge, Timber Research Laboratory, Sentul, Malaya (three lectures):

‘The application of research to the utilization of timber.’

Mr. H. P. Smart, Colonial Agricultural Service, lately Agricultural Officer, British Honduras (one lecture with films):

‘Forest and general conditions in British Honduras.’

Mr. H. Hugo Brunt, Forest Service, Cape Colony, Union of South Africa (five lectures):

‘Drift-sand reclamation and fire protection in South Africa.’

Mr. H. C. King, Colonial Forest Service, Mauritius (one lecture):

‘Forestry in Mauritius.’

Dr. K. S. Sandford, Department of Geology, Oxford (one lecture):

‘The geology of the central part of Africa.’

Mr. N. S. Stevenson, Conservator of Forests, British Honduras (two lectures):

‘Vegetation survey as a step towards an ordered land policy.’

‘Silvicultural problems in British Honduras.’

Mr. C. G. T. Morison, Soil Science Laboratory, Oxford (one lecture):

‘The soils of the tropics in relation to the vegetation.’

Dr. P. Richards, School of Botany, Cambridge (three lectures):

‘Primary rain forest types in British Guiana.’

‘Primary rain forest types in Sarawak.’

‘Primary rain forest and the secondary succession in Southern Nigeria.’

Mr. C. E. Duff, Colonial Forest Service, Northern Rhodesia (one lecture):

‘Northern Rhodesia—(a) the method adopted by the Ecological Survey, and (b) problems of timber supplies for mines.’

Mr. M. P. Vidal-Hall, Assistant Conservator of Forests, Sudan (one lecture):

‘The exploitation of the *Acacia arabica* forests of the south-eastern Sudan.’

8. The third informal meeting of Colonial Forest Service officers on leave was held as usual in June, and attended by representatives from British Honduras, Malaya, Nigeria, Northern Rhodesia, Trinidad and Uganda. A member of the Sudan Forest Service also attended as a visitor. Major W. F. Chipp, Advisory Forest Engineer, Malaya, and Major F. M. Oliphant of the Colonial Forest Resources Development Department were present

at the first session, and an interesting discussion took place on the development of sawmilling in the tropics. The rest of the time was occupied in consideration of the details of a tentative scheme for standardization of statistical forms for the annual reports of colonial forest departments. Substantial agreement was reached, and the scheme in its final form was submitted to the Colonial Office after the close of the year. The need for better statistical data regarding progress in forestry in the colonies has long been evident, and this scheme is the outcome of a suggestion made by a committee of colonial delegates to the Empire Forestry Conference of 1935. Other subjects discussed were the documentation work of the Institute and of the projected Imperial Forestry Bureau, and the possibility of collating information with regard to sleeper specifications laid down by colonial railways.

SPECIAL STUDIES.

9. Dr. A. Grasovsky, Colonial Forest Service, Palestine (St. Catherine's Society), mentioned in last year's report as having been registered as a Diploma Student, completed his report on his tour in Africa, the United States and the Far East to study erosion control methods, and it has been published as *Institute Paper No. 14* (see Appendix III). The report, together with a summary of the conclusions reached, was accepted as a thesis qualifying for the Diploma of Forestry.

10. Mr. J. D. Martin, Northern Rhodesia (University College), spent a large portion of his leave of absence in identifying ecological material collected in the *Baikiaea plurijuga* zone of Northern Rhodesia, and in writing the outline of a thesis for the B.Sc. degree. The subject of his thesis is 'The Forest Communities of the Kalahari Sand Region of Northern Rhodesia with Special Reference to the Distribution of *Baikiaea plurijuga* Climax Forest.' During his residence of several years in that region of the Colony, Mr. Martin has accumulated a mass of useful data bearing on the subject. This has now been put in form for the thesis, and he has returned to duty with the purpose of filling in the gaps and carrying out further investigations to round out the thesis, which he hopes to complete on his next leave.

BOTANY SECTION.

11. In anticipation of Dr. Burt Davy's retirement, and in order that he might concentrate on the proposed regional forest floras of Africa, much of the administrative work of the section has this year devolved on Mr. Hoyle.

12. Dr. Burt Davy lectured on Systematic Botany during Michaelmas and Hilary Terms, and on Tropical Ecology during Trinity Term. Four Burma probationers took the former course, one forest officer worked in the section throughout the year, and two for two terms; eleven other forest officers spent varying periods at work in the herbarium or in attendance at lectures.

13. Identifications done (Appendix IV) were rather more than last year, but this branch of the work has fallen still further into arrear owing to pressure of other urgent work. Only one member of the staff, Mr. H. L. Dunkley, was regularly occupied in identification, and his descriptions of nine new species and one new variety have appeared in the *Kew Bulletin*, 1937.

14. Mounting and additions to the herbarium have remained practically at a standstill owing to shortage of subordinate staff. About 1,000 specimens were filed and about 500 mounted by a temporary assistant. Herbarium accessions and exchanges are shown in Appendices V and VI.

15. Most of Mr. Beak's time during the early part of the year was occupied in the final revision of Mr. Cansdale's paper on the 'Black Poplars and their hybrids cultivated in Britain,' which has now been published.

16. The first Ceylon Check-list has been re-typed and stencilled, and is now waiting to be multigraphed and distributed. The first descriptive Check-list for Tanganyika Territory, on which Dr. Hora has been working, will attain such bulk that an index of vernacular and botanical names is being prepared first; for this purpose Mr. Fraser was deputed from the Tanganyika Forest Service and worked in the herbarium with Dr. Hora for a month.

17. The vernacular index of the Nyasaland Check-list is being brought up to date by the addition of a supplementary list, prepared by Mr. Dunkley, of ninety vernacular names.

18. Much of Dr. Burt Davy's time has been occupied in the preparation of a classification of Tropical Woody Vegetation-Types (*Institute Paper No. 13*), with a view to reducing the chaos of ecological nomenclature to a workable scheme. Before publication of this paper, the questions involved were exhaustively discussed with a number of forest officers and others possessing first-hand knowledge of tropical vegetation.

19. At the British Ecological Society's annual meeting on January 5th, 1938, Dr. Burt Davy opened a discussion with a paper on 'The Nomenclature of Forest and Woodland Communities.' Papers arising from their studies at the Institute were also read by Mr. J. D. Martin (Northern Rhodesia) on 'The Vegetation of the Kalahari Sands of Northern Rhodesia,' and Mr. J. Dundas (Nigeria) on 'Some Vegetation Changes in the Sahelian Zone of the Southern Sahara.'

20. Mr. C. S. Cree, on probation from Uganda, prepared a practical card-key to Uganda trees and shrubs with the collaboration of the herbarium staff.

21. Mr. Hoyle's revision of the genus *Brachystegia* has been brought a stage nearer completion. The number of specimens requiring attention continues to increase, and the known range of variation widens with each collection, so that frequent name-changes are necessary. In particular, a large and comprehensive collection of *Brachystegia* specimens presented by the late Mr. B. D. Burttt of the Tanganyika Tsetse Research Department has thrown new light on many species. It is to be feared that Mr. Burttt's untimely death may retard progress in our knowledge of the genus in many parts of Tanganyika Territory.

22. In a study undertaken for the Forestry Commission, Messrs. Hoyle and Beak spent two days in the Isle of Wight in April, 1938, making a botanical survey of the Commission's Poplar plantations. It is hoped that the resulting report will prove helpful in future planting of Poplar species. Dr. Burttt Davy paid two visits to the Commission's Willow plantations at Huntley, Aberdeenshire, with Professor Steven and Mr. Scott, and gave advice on problems of cultivation.

23. Dr. H. Bancroft, whose research work is carried out at the Institute but not financed from Institute funds, continued her studies of *Monotes* and *Ulmus*. This year she has identified a large number of *Monotes* specimens for Kew (B. D. Burttt's latest collection), the British Museum, the Imperial Forestry Institute, and in Paris and Lisbon. During the Easter Vacation a grant from the Christopher Welch Fund made it possible for her to visit the herbaria of the University of Lisbon, the Jardim Colonial at Lisbon, the University of Coimbra, and the Jardin des Plantes in Paris. In addition, the collections of *Monotes* by Mr. Exell and Dr. Mendoça from the late Dr. Carisso's Angolan expedition are now under examination at Oxford.

24. As a collaborator in the *Conspectus Florae Angolensis*, Dr. Bancroft was invited to contribute to the memorial publication of the Sociedade Broteriana, in honour of Dr. Carisso. Her contribution takes the form of a revision to date of the taxonomic, ecological and geographical relations of *Monotes*, and is now in the press.

25. Dr. Bancroft's studies in the genus *Ulmus* are being continued in Great Britain and on the Continent at every opportunity. She has lately been concentrating on fruit-characters, and is of the opinion that these do not materially assist in the identification of hybrid forms. She has taken over the prepara-

tion of *Dendrological Notes*, periodically issued by the Documentation Section.

26. The Section is indebted for valuable help and co-operation to the Sherardian Professor of Botany, Oxford; the Director of the Royal Botanic Gardens, Kew; the Keeper of Botany, British Museum (Natural History); Dr. Helen Bancroft, and many others.

WOOD STRUCTURE SECTION.

27. Dr. L. Chalk remained in charge of this section. Dr. M. M. Chattaway was away for most of the year, carrying out research at Yale University under a Sterling Fellowship. Two probationers and one forest officer underwent courses of instruction.

28. Dr. Chattaway continued, at Yale, her research on the technique of describing and identifying woods, and added data on over 700 genera not represented at Oxford. Data have now been accumulated on nearly 2,000 genera of the dicotyledons, and a start has been made with the preparation of descriptions of the wood anatomy of the more important families.

29. Dr. Chalk has been investigating the distribution of vessel diameter and ray width in the dicotyledons, with a view to standardizing the terms of size used to describe these features.

30. Dr. Chalk was elected to succeed Professor S. J. Record as Secretary-Treasurer of the International Association of Wood Anatomists.

31. The 'punched card' system of recording anatomical data, introduced by the Forest Products Research Laboratory, Princes Risborough, has been further tested and a modified set of features, for macroscopic work only, has been evolved in collaboration with that institution. This has proved very valuable for graduate students and further development on these lines is likely in the future.

32. The number of specimens received for identification during the year was one hundred and seventy-five; this is a considerably greater number than in previous years. Seven hundred and seventeen woods were added to the type collection, which now totals 12,595, and slides were prepared of 80 woods. Distributions in exchange for specimens amounted to 322 woods and 54 slides.

FOREST PATHOLOGY SECTION.

33. Mr. W. E. Day continued in charge of this Section, assisted by Mr. T. R. Peace, who spent the last four months of the year studying forest pathological problems in the United States and Canada.

34. Research on the frost resistance of races of European Larch was continued. Plants raised from seed from German Silesia, of the race often known as Sudeten Larch, were definitely worse damaged than those of Tyrolese origin.

35. Further work was carried out on the control of frost lift by the use of soil coverings. Confirmation was obtained that peat is valuable for this purpose.

36. A number of Larch cankers in Bagley Wood near Oxford were carefully outlined with pins in the autumn of 1937 so that their subsequent development could be followed. So far they have not made any appreciable spread.

37. The usual annual survey of Elm Disease was made and reported on. The disease was found to be still spreading slowly. Propagation of the resistant Elm obtained from Holland is proceeding, though it now appears that its habit of growth will not be as desirable as had been hoped. In order to avoid this uncertainty as to the final habit of the mature tree, a number of large Elms, which have resisted natural infection in areas where the disease is rife, were heavily inoculated in the summer of 1938 with a view to their propagation should they prove resistant. So far they have shown a high degree of resistance. They will be propagated for experimental purposes during the coming winter and spring. The young plants will be inoculated in order to discover whether their resistance to disease is equal to that of the mature trees.

38. Mr. Peace made a special study of Douglas Fir in British Columbia and in other parts of its native habitat. A large number of herbarium specimens was collected and now awaits examination by the Botany section. Indications from field observations throughout the native range of American Douglas Fir are that the results of a proper systematic examination will support the view of some taxonomists that a complete series of variations exists between the two extreme types known in Europe as *Pseudotsuga taxifolia*, the Green Douglas Fir, and *P. glauca*, the Blue or Colorado Douglas Fir. In most cases a large number of these variations is to be found growing together on the same site. The systematic value of the name *P. taxifolia* var. *caesia*, the intermediate or Fraser River Douglas Fir, thus becomes doubtful. A careful revision of the nomenclature of this group, adequately based upon a wide survey of its distribution, would be of great value to British forestry.

39. Information was also collected on the occurrence of disease on Douglas Fir in its native habitat. Arrangements have been made for seed to be collected in British Columbia from specially selected sites distributed over an east-to-west section of the range of the tree in that province. The seed will

be grown in this country and also in British Columbia in co-operation with the Dominion Laboratories of Plant Pathology. It is hoped later to conduct studies on the growth, taxonomy and disease-resistance of the progeny from this seed.

40. It has been proved by Miss Koning in Holland that the canker of Poplars which is prevalent in this country and also occurs there, is caused by a bacterium, *Pseudomonas rimae-faciens*. Work has been started on the susceptibility to this disease of new hybrid Poplars, and may be considerably extended as a result of Mr. Peace's visit to North America.

41. Many of the Japanese Chestnut being raised to make experimental plantations for the study of Ink Disease were injured by frost and rendered useless: it is possible that this species may be too frost-tender for this country. Inoculation experiments on it continue, and are now being made on trees raised from seed presented by the United States Department of Agriculture through the courtesy of Professor Beattie. A survey, made from the south-east to the south-west of England, of the sites on which the disease occurs shows that there is a clear correlation between its occurrence and the presence of a moist soil. In the sub-soils of affected sites drainage is usually impeded. The disease has not been found on sites with light, easily draining soils. It is hoped shortly to publish a paper summarizing this work.

42. A considerable number of minor diseases have come under investigation during the course of the year. So far most of these have been found only within a limited area, within which, however, they cause considerable damage. They include a canker of young Oak regeneration in the Forest of Dean, a root disease of Sitka Spruce in Dumfriesshire, a die-back of the tops of large Norway Spruce in the same county, a canker of Sycamore in Yorkshire, a die-back of large Douglas Fir in the New Forest, and a disease of Norway Spruce seedlings in Gloucestershire caused by *Phomopsis occulta*. Fungi have been isolated in all these cases, and inoculations are in progress to test their pathogenicity.

43. A number of the factors responsible for the forking of Ash are already known, but an investigation has been started to obtain more exact information with regard to this tendency, and preliminary observations have been begun on one site. The work will be extended next season to a number of sites.

44. Work on silvicultural problems for the Forestry Commission was continued by Messrs. Day and Sanzen-Baker in collaboration, and the report, referred to last year, on certain forests in the South Wales and Monmouthshire Coalfield was presented during the Michaelmas Term.

45. The most important field investigation now in progress relates to the afforestation of chalk downland, with particular reference to the establishment of Beech forest.

46. Further field studies have been made in connection with Poplar cultivation, on which a report is shortly due.

47. Some preliminary field investigations have been made into cases of disease suspected to be due to deficiency of some essential food substance. Mr. F. H. Jones has been engaged on this work, and Dr. Roach of the East Malling Research Station has been very helpful, especially in giving instruction in technical methods of research.

48. Mr. Day continued to lecture as in the previous year on Elementary Statistics and Forest Hygiene.

49. About fifty enquiries were dealt with during the year. It is very difficult to deal with such cases adequately without investigation on the spot. Regular inspection work of this kind is outside the scope of the Section, but every endeavour is made to include as many visits as possible in the course of tours made in connection with current research projects.

ENTOMOLOGICAL SECTION.

50. Dr. Chrystal, who remained in charge of the Section, gave the usual course of lectures on forest entomology to the Institute probationers. Four lectures with practical demonstrations were arranged for members of the School of Agriculture who wished to cover the syllabus of the Surveyor's Institute examination, and two lectures were given in July at the Forestry Commission training school at Parkend, Forest of Dean. Experimental and research work conducted by Mr. J. M. B. Brown was as summarized below.

51. The survey of the cockchafer problem in the nurseries of the Forestry Commission, begun in April, 1937, was completed in September, and a summary of the information collected presented at the close of the same year. The report gave an account of the four species of chafers commonly recognized as pests, and attempted to correlate their distribution with variations in climatic and edaphic factors, and with changes in nursery practice. The common cockchafer, *Melolontha melolontha* L., was found to be the most common and widespread species, but is regarded as a pest only in those regions of the South and Midlands of England lying within an area bounded approximately by the July isotherm of 62° F. and, outside this area, in certain sheltered valleys with a southerly aspect. The Forest of Dean and two nurseries in the south-east of England

have had serious outbreaks of this species in recent years. Where the species is plentiful, abundant flights are recorded in the even years between leap years (1934, 1938, etc.).

52. Of the other species, *Amplimallus solstitialis* L. occurred in the nurseries of the Eastern Counties, and in the Thames Valley in sandy soils. It is not regarded as serious at present. *Phyllopertha horticola* L., the Garden Chafer, was found in many nurseries on sandy soils, in particular at places in the West, for example, Delamere (Cheshire) and Corris (Merioneth). At Delamere it has caused disastrous losses of seedlings in recent years, but the numbers are considerably down at the present time. The one-year life-cycle of the species makes control by intensive cultivation a difficult matter.

53. *Serica brunnea* L., the Brown Chafer, although never so abundant as the species last mentioned, occurs all over the country from Inverness to Kent and from Lincolnshire to Devon. In several nurseries in Scotland and Wales it was plentiful enough to cause serious losses in plants. A fifth species of chafer, *Anomala aenea* De Geer, was found sparingly in the Eastern Counties.

54. Since the completion of the survey, more detailed ecological work has been started on the three important species. More accurate knowledge of the biology of the insects in the habitat provided by forest nurseries will, it is hoped, suggest methods of control along ecological lines. Further trials of chemical larvicides and deterrents to oviposition are also in progress.

55. The survey of the damage caused by the Pine-shoot Beetle (*Myelophilus piniperda* L.) having been completed in the spring of 1937, a detailed report on this and some related ecological studies was prepared in the autumn.

56. Arrangements have also been made to co-operate with Mr. H. S. Hanson, Field Officer of the Imperial Institute of Entomology at the Parasite Laboratory, Farnham Royal, in studying the biology of some of the more important hymenopterous parasites of the Pine-shoot and other bark-beetles about which little is known.

57. In the Pine-weevil experiment in the New Forest, trapping was carried out in the selected strips laid down in 1937, and during last winter (1937-38) all five strips were planted with Scots Pine. All areas were trapped during the present season, and periodical assessments of weevil damage made. Records of numbers of traps, frequency of collection in relation to intensity of damage and cost of operations are being kept. At the present time, it does not appear likely that trapping before planting will be an adequate insurance against weevil damage,

but a final opinion on this question must await the results of the 1939 season's trapping.

58. The number of enquiries received during the year was well up to the standard of previous years, numbering over fifty. The most interesting records obtained from this source related to the destruction of young conifers in the nursery at Dartington Hall, Devon, by the weevil *Barypeithes pellucidus* Boh, damage by ants to the roots of young Spruce trees at Oundle, Northants, and an outbreak in Yorkshire of the Small Larch Sawfly, *Nematus laricis* Htg., on young Larch 25 ft. high.

SILVICULTURE.

59. Professor Troup gave his regular course of lectures on tropical silviculture during the Trinity Term.

60. The Forestry Commission's Research Officer for England and Wales (Mr. R. G. Sanzen-Baker) remained attached to the Institute, and the following brief account of his research activities may be included in this report. No teaching work is associated with the post, but much of the research work done, for example in connection with sample plots, is of value for instructional purposes.

61. Research on nursery practice was pursued principally at Kennington Nursery, on the outskirts of Oxford, and also at nurseries of the Commission in Yorkshire, Norfolk, Suffolk and elsewhere. The programme of investigation included work on the stratification of seed, time and density of sowing, and the use of seed-bed coverings consisting of grits, coarse sands and pumice. Experiments were made with seed-bed mediums and fertilizing technique, using peats, humus, woodland soil and composts together with artificial and natural manures, and with the vegetative propagation of conifers and hardwoods and the use of growth hormones. A further activity was the raising of sturdy planting stock of Walnuts, Poplars and Willows.

62. Facilities were afforded at Kennington Nursery to Mr. J. M. B. Brown for his work on Cockchafers and to Mr. T. R. Peace for his pathological studies. The nursery had many visitors during the year, both British and foreign, the latter including American, Danish and Japanese.

63. In collaboration with Mr. W. R. Day, a detailed report was prepared on the investigation, referred to in last year's report, into the condition of tree crops in certain forests in the South Wales and Monmouthshire Coalfield.

64. The most important field investigation in progress at the moment relates to the afforestation of exposed chalk down-

land, with particular reference to the establishment of Beech forest. Several new experiments were laid down in this connection. Further evidence was collected bearing on the study of Poplar cultivation, and several new species were introduced into the Poplar garden at Yardley Chase. Also a mulching experiment at this forest is giving interesting results. Both of these projects are being carried on in collaboration with Mr. Day.

65. Other field work includes a study of mixed plantations of Pine and Spruce; an investigation into the rooting of Oak on heavy clay soil in Rockingham Forest, Northants; and detailed studies of the rooting of several species, both conifers and hardwoods, on severely podsolized *Calluna* moorland at Allerston Forest, Yorkshire. Additional plots were established for the study of provenance of *Pinus contorta*, *Picea sitchensis* and *Picea excelsa*.

66. Work was continued on the use of the special composts prepared by Dr. Rayner for the establishment of Pines on poor *Calluna* moorland.

67. Further experiments were laid down in connection with the use of the French plant roll machine for planting seedlings with their roots enclosed in a packet of prepared soil.

68. Thirty-seven forest-sample plots were thinned and re-measured according to programme, and a special measurement was carried out in a Douglas Fir plantation that was being felled for pit-props.

69. A review was undertaken of the literature on the Mistletoes, and the results were embodied in an Institute Paper (No. 12).

70. Mr. Sanzen-Baker dealt during the year with a number of enquiries, both personal and written, and, in the absence of Mr. Peace in America, made one advisory visit on his behalf. He held various informal discussions with British and foreign forest officers from overseas who had occasion to visit the Institute, and was able to be of some assistance to them in arranging tours in the United Kingdom.

71. At the instance of Dr. M. C. Rayner, the Institute addressed a questionnaire to forest departments and research institutes throughout the Empire on the use of soil and humus inocula in plantations. A number of interesting replies were received, and the results will be summarized by Dr. Rayner in an article to be published in the *Empire Forestry Journal*. The Forest Research Institute, Buitenzorg, Java, also furnished some very useful data in response to the questionnaire.

SOIL SCIENCE.

72. During the Trinity Term, Mr. C. G. T. Morison gave a lecture on tropical soil science to Institute students, and Mr. G. R. Clarke delivered a series of lectures on the more general aspects of soil science to a class of probationers and refresher course students. This course was supplemented by weekly excursions to places in the neighbourhood of Oxford, conducted by Mr. Clarke and accompanied by Mr. Hoyle of the Botany Section of the Institute, to study the relationships between soil and vegetation. Considerable interest continues to be taken in these studies by forest officers from overseas.

73. It is hoped to make arrangements whereby Mr. Hoyle will accompany Mr. Morison on a soil investigation in the Sudan during the coming winter. The expedition should provide valuable opportunities for study of the relationships of soil, vegetation and climate under tropical conditions.

FOREST ENGINEERING AND UTILIZATION.

74. Mr. Lloyd, in charge of this Section, gave a course of lectures in forest utilization, with practical work in the forests, to students taking the examination of the Surveyors' Institution and the Land Agents' Society, and also to graduates preparing for the newly instituted Certificate of Proficiency in Estate Management.

75. Lectures and practical work in field engineering, including bridge construction, were attended by forest officers on leave from Malaya, India and East Africa. The practical work was also attended by five probationers for the Colonial Administrative Service. An officer on leave from Malaya was given a complete course in forest utilization and engineering.

76. The extraction and conversion of timber, including the preparation of pitprops, were studied at local sawmills and timber-yards, and a forest road under construction in Gloucestershire for timber extraction was visited. Two conducted visits were made to the Forest Products Research Laboratory at Princes Risborough, and thanks are due to the Director of that institution for the facilities provided on those occasions.

77. A practical test, held in Bagley Wood, of a new tractor-driven portable winch for timber extraction was attended by probationers and forest officers on leave.

78. An extraction scheme for hill forests on a private estate in the Cheviots has been prepared and includes the construction of a forest tramway, which was aligned by students during the vacation.

79. Advice and assistance given to College Bursars in felling and utilization problems led to two considerable sales of timber from College woods during the year.

80. Miscellaneous enquiries increased this year to thirty-four.

81. The completion of the Forest Engineering Pocket Book, mentioned in last year's report, awaits an opportunity for a further visit abroad to study the latest methods of timber extraction and other forest engineering works.

82. More than three-quarters of the time of the Section was, as usual, occupied by School of Forestry duties during the year.

LIBRARY.

83. Books received and catalogued during the year numbered 106; pamphlets and bulletins, 691. The number of current periodicals taken is now 125. Eight new journals are being received regularly, and several formerly listed as serials are now entered as periodicals. Five periodicals have been dropped since the last report.

84. The library holds, from research institutions and other official sources, British, foreign and international, 772 separate series of bulletins and reports, of which 100 have been added during the last two and a half years, and 670 are current. Such material, totalling many thousands of items, is received almost entirely in exchange for Institute publications. Only seventeen series are paid for, of which 16 are international, consisting mainly of reports of congresses, and one Swiss. The above total of 772 is exclusive of working plans, non-serial pamphlets and reprints.

85. Borrowings, exclusive of literature consulted in the library, were 2,661, of which 198 were by readers outside the Department. Readers in the library numbered about 600 and visitors 160. External enquiries, involving preparation of lists of literature on specific subjects, totalled 40.

86. The system begun last year arranging for the supply of literature listed in the *Current Monthly Record* was continued, and 33 orders, covering 155 items, were received and dealt with during the year.

87. Part III (Forest Protection) of the *Forest Bibliography* was published during the year, and satisfactory progress was made with the preparation of Part IV (Forest Utilization).

88. Grateful acknowledgments are due for gifts made to the library by the following :—The National Home-Grown Timber Council; the British Wood Preserving Association; the management of the West African Pavilion, Empire Exhibition, Glasgow;

the Department of Scientific and Industrial Research; the Forest Products Research Laboratory, Princes Risborough; the Imperial Bureau of Soil Science; the Imperial Bureau of Plant Genetics; the School of Agriculture, University of Cambridge; the Danish Legation, London; the Imperial College of Tropical Agriculture, London; the Royal Italian Consulate General, London; the Public Relations Division of Health; the Quain Professor of Botany, University of London; Messrs. Ruston and Hornsby Ltd.; the Royal English Forestry Society; Messrs. Plant Protection Ltd.; Messrs. Imperial Chemical Industries Ltd.; the National Physical Laboratory; the School of Rural Economy, University of Oxford; the Department of Botany, University of Oxford; the Bodleian Library; Dr. L. Chalk; Dr. R. N. Chrystal; Mr. P. S. Spokes; Mr. G. S. Cansdale; Mr. I. Kissin; Mr. H. S. Single; Mr. T. W. Summers; Dr. J. Burt Davy; Dr. H. Bancroft; the Professor of Forestry, University of Oxford; the Director, Imperial Forestry Institute; the Shellac Research Bureau, London; the Canadian Society of Forest Engineers; the High Commissioner for South Africa, London; the High Commissioner for India, London; the Secretary of State for the Colonies; the Secretary, National Shade Tree Conference, Boston, Mass., U.S.A.; the Polytechnic Institute; the Agricultural Experiment Station, Alabama; the Bureau of Agricultural Economics, United States Department of Agriculture; Iowa State College of Agriculture and Mechanic Arts; Mississippi Agricultural Experiment Station; Missouri Botanical Garden; the Polytechnic Institute of Brooklyn; the Shellac Research Bureau, New York; Nebraska University Agricultural Experiment Station; Appalachian Forest Experiment Station, North Carolina; Ohio Agricultural Experiment Station; Pacific Northwest Agricultural Experiment Station, Oregon; the Department of Forestry, University of Tennessee; Utah Agricultural Experiment Station; the Academy of Sciences, Arts and Letters, Utah; the Smithsonian Institution, Washington; the Carnegie Institution of Washington; the Department of Agriculture and Markets, Wisconsin; Lake States Forest Experimental Station, Minnesota; the American Tree Association, Washington; Puutekniikan Tutkimuksen Kannatusydistys o.y., Finland; Svensk Trävarutidning, Sweden; Ministerio de Agricultura, Argentina; the Department of Biology Studies, Shanghai Science Institute, China; the Fan Memorial Institute of China; Instituto Botanico de la Universidad Central, Ecuador; Station de Recherches forestières du nord de l'Afrique, Algeria; Forest Research Station, Sopron, Hungary; Institut de Recherches forestières à Belgrade, Yugoslavia; the Forest Research Station, Latvia; Institut de Recherches forestières, Warsaw, Poland; Kolningslaboratoriet, Sweden; Ingeniorsvetenskapsakademien, Sweden; Departamento autonomo forestal y de caza y pesca,

Mexico; the Department of Agriculture and Commerce, Manila, Philippine Islands; the Commission for Plant Protection, Czechoslovakia; Lenin Academy of Agricultural Sciences, Russia; Association de l'Economie Alpestre, France; the Institute of Forest Engineering, Poland.

89. A special acknowledgment is also due to Miss Merchant, who contributed eighty-four hours' voluntary assistance between February and June.

90. Nine additions were made to the list of institutions with which an exchange relationship is maintained; of these all but one were foreign. The list now stands at 137.

91. The number of bound volumes of books in the library is 3,785; of bound volumes of periodicals 3,267.

DOCUMENTATION.

92. The examination and indexing of all forestry literature received in the library was continued. The *Current Monthly Record* was issued throughout the year; its contents are now arranged under twenty-four subject heads, thus considerably simplifying its use. The General Index has been maintained and continues to be classified in accordance with the International Decimal Classification No. 634.9.F. Within the limitations imposed by inadequacy of staff and funds, individual enquiries for references to literature and for abstracts have been met.

93. The issue of the half-yearly *News Bulletin of Empire Forest Departments* continued, and new and welcome contributions were received from the Forest Research Institute, Dehra Dun, and the Forestry Commission of Great Britain. Arrangements have been introduced for the supply of personal copies of the *Bulletin* to officers of the forest services at a small yearly charge, and it is hoped that this will help to increase its circulation throughout the Empire.

94. The final arrangements for establishing an Imperial Forestry Bureau under the Imperial Agricultural Bureaux scheme have not yet been concluded, but it is probable that the bureau will be in regular operation early in 1939. Meanwhile a nucleus organization is at work in premises in the vicinity of the Institute, and the preliminaries are well in hand. The fulfilment of this project will enable the services and facilities hitherto provided by the Documentation Section to be greatly extended.

95. The collection and distribution of the sets of bibliographical references compiled under arrangements made by the

International Union of Forest Research Organizations continued during the year.

96. In addition to the normal editions of the *Current Monthly Record* and the *News Bulletin*, six Institute Papers and one Technical Paper were issued; the titles of these will be found in Appendix III.

97. The issue of a number of other reports and publications was also undertaken by the Section; this included a draft of the first Descriptive Check-List of the Gold Coast, a translation of the Report of the Niger Colony Expedition, 1935 (on behalf of the Forestry Department of Nigeria), the report of Dr. Chalk's tour in 1937, together with the duplication of material on behalf of the Forestry Commission, the School of Forestry and individual Forest Officers.

98. The Documentation Officer attended the Fourteenth Conference of the International Federation for Documentation held at Oxford and London. Among the matters discussed were the technique and apparatus for the photographic reproduction of documents, and the question of copyright of published scientific articles. A comprehensive exhibition of the various forms of photographic apparatus designed for bibliographical work provided information which will be most helpful in deciding how such methods can be applied to the documentation of forestry literature. At present the possibilities of their development seem to hinge on the provision of suitable and inexpensive apparatus for viewing of microfilm reproductions of documents, and it is to be hoped that eventually a 'viewer' will be produced which can be confidently recommended for use by forest departments and institutions overseas.

FINANCE.

99. The audited accounts of the Institute will appear as usual in the *Oxford University Gazette*. An analysis of receipts and payments, designed to show the distribution of expenditure among the various sections and activities of the Institute, will be found in Appendix II. The figures in this statement have been approximated to the nearest pound. The year opened with a balance in hand of £739 and closed with a surplus of £1,021, and actual expenditure, exclusive of these balances, was £10,480 as against £10,871 in the previous year. Total receipts were £10,762 as against £11,359 in 1936-37. Grants from the Dominions decreased, due to a reduction in the South African contribution and the non-receipt of the contribution from Southern Rhodesia, which however was paid after the close of the year. Fees were nil, against £161 in the previous year.

ADMINISTRATION AND GENERAL.

100. A list of the staff at the close of the year is given in Appendix I. The post of Director was held by the undersigned throughout the year.

101. The Director wishes to thank Professor Troup and the staff of the Institute for their co-operation, and to express his appreciation of the assistance given to the Institute in its work by other Departments of the University.

J. N. OLIPHANT,

Director

(on behalf of the Committee for the Imperial
Forestry Institute).

OXFORD.

November 29th, 1938.

APPENDIX I.

LIST OF STAFF.

I. STAFF ENGAGED IN INSTRUCTION AND RESEARCH.

- *Professor R. S. TROUP, C.M.G., C.I.E., M.A., D.Sc. (Oxon.), F.R.S.,
Fellow of St. John's College. Silviculture.
- J. N. OLIPHANT, M.A. (Oxon.), Christ Church (*Director*). Tropical forest
economics and policy.
- †J. BURTT DAVY, M.A., D.Phil. (Oxon.), Ph.D. (Cantab.), University
College. Forest botany and ecology.
- A. C. HOYLE, B.Sc., M.A. (Oxon.), Pembroke College. Forest botany
and ecology.
- †L. CHALK, M.A., D.Phil. (Oxon.), University College. Wood structure
and properties.
- (Miss) M. M. CHATTAWAY, B.Sc., M.A., D.Phil. (Oxon.), St. Hugh's
College. Wood structure and properties.
- †W. R. DAY, B.Sc., M.A. (Oxon.), Exeter College. Pathology, forest
hygiene, silviculture.
- †R. N. CHRYSTAL, D.Sc. (Edin.), Hon. M.A. (Oxon.). Forest zoology.
- *†A. H. LLOYD, M.C., M.A. (Oxon.), Exeter College. Forest engineering
and utilization.

II. STAFF ENGAGED SOLELY IN RESEARCH FOR THE FORESTRY COMMISSION.

- T. R. PEACE, M.A. (Cantab.). Pathology and Mycology.
- J. M. B. BROWN, B.Sc. (Belfast). Entomology.
- R. G. SANZEN-BAKER, B.Sc. (Edin.), *Forestry Commission Research Officer
for England and Wales*. Silviculture.

III. STAFF OF OTHER UNIVERSITY DEPARTMENTS ASSISTING IN
INSTRUCTIONAL WORK.

- Professor T. G. B. OSBORN, M.A., Sherardian Professor of Botany, Fellow
of Magdalen College. Ecology.
- C. G. T. MORISON, M.A. (Oxon.), University Reader in Soil Science,
Student of Christ Church. Soil Science.
- G. R. CLARKE, B.Sc., M.A., Lecturer in Soil Science, Department of Rural
Economy, Oriel College. Soil Science.
- H. S. WILLIAMSON, M.A. (Oxon.), Christ Church. Forest law and land
tenure.

IV. DOCUMENTATION SECTION.

- P. S. SPOKES, B.Sc., M.A. (Oxon.), The Queen's College.

V. OTHER STAFF.

- Secretary* : Miss C. MEMMOTT.
- Librarian* : Miss G. GUINEY.
- Accountant* : F. E. BALMAN.

* The Institute is responsible for approximately 18 and 52 per cent.
respectively of the salaries and contingent superannuation fund contributions
of Professor Troup and Mr. Lloyd.

† These members of the staff have the status of University Demonstrators,
having been reappointed as such with effect from the following dates: Dr.
Burtt Davy, 1.10.33; Mr. Lloyd, 1.10.34; the remainder, 1.10.36.

APPENDIX II.

IMPERIAL FORESTRY INSTITUTE, 1937-38.

GENERAL ACCOUNT.

RECEIPTS.		PAYMENTS.			
	£		£		£
Surplus, July 31st, brought forward	739	Administration	2,019		
Grants from:—		Botany	1,695		
Forestry Commission:		Drawing Office	197		
General	2,100	Engineering	358		
Special	1,452	Entomology	880		
Colonies	5,000	Library	383		
Dominions	267	Mycology	881		
Indian Provinces	1,000	Photographic	153		
Sudan	50	Publications	81		
D.S.I.R.	150	Silviculture	330		
Sale of Publications	191	Tours and Fees	98		
Sale of Photographs, Slides, etc.	23	Wood Structure	951		
Interest on Deposit held by Capital Account	529	Documentation	952		
		Forestry Commission:—			
		Mycology	869		
		Entomology	583		
		Repayment of Mortgage, <i>infra</i>	50*		
					10,480
		Surplus, July 31st, 1938, carried forward—			
		Accounts receivable	94		
		Grants due	146		
		Cash at Bank	437		
		Amount held by Univ. Chest	2,286		
		Cash on deposit	1,959		
			4,922		
		Less Grants in advance	3,851		
		Accounts owing	50		
			3,901		
					1,021
	£11,501				£11,501

CAPITAL ACCOUNT.

	£		£
Balance, July 31st, 1937, brought forward from last account	24,531	Balance, July 31st, 1938, carried forward to next account	24,581
General account, <i>supra</i>	50*		
	£24,581		£24,581

* £900 were drawn from Capital Account in 1931-32 to pay off mortgages on premises at 6 Keble Road and 18 Museum Road, and this sum is being repaid from General Account in yearly instalments of £50.

APPENDIX III.

PUBLICATIONS, 1937-38.

- BANCROFT, H. The British Elms. (*Journal of Botany*, Vol. 75, 1937).
 The Lesbos woods. (With notes on occurrence by W. Lamb.) (*Annual of the British School at Athens*, 1938).
- BROOKS, R. L. Forestry and the petroleum industry in Trinidad. (*Institute Paper* No. 10, 1937).
- BURTT DAVY, J. The forest flora of South Tropical Africa and its distribution in relation to topography and climate. (*University of Oxford: Abstracts of Dissertations for the Degree of Doctor of Philosophy*, Vol. 10, pp. 201-216).
 Note on the Red Whortleberry, *Vaccinium vitis idaea* L. (*Journal of Botany*, Vol. 75, 1937, pp. 330-331).
 A new variety of *Salix alba* Linn. (*Journal of Botany*, Vol. 76, 1938, pp. 141-143).
 The nomenclature of forest and woodland communities. Paper read before the British Ecological Society, January 6th, 1938.
 The classification of tropical woody vegetation-types. (*Institute Paper* No. 13, 1938).
Acacia saligna and *A. cyanophylla*. (*Chronica Botanica*, Vol. 4, 1938, pp. 29-30).
 Classification of Coniferae II. (*Forestry*, Vol. 11, 1937, pp. 122-123).
Ricinodendron rautanenii in Nyasaland. (*Kew Bulletin*, 1937, p. 358).
Erismadelphus Mildbraed. (*Tropical Woods* No. 51, pp. 18-19).
 Note on *Argyrodendron*. (*Tropical Woods* No. 51, pp. 19-20).
 (A new species of *Commelina*, and *Myrica mossii* Burt Davy, have been accepted and will shortly be published by the *South African Journal of Botany*).
- CANSDALE, G. S., and BEAK, P. G. The Black Poplars and their hybrids cultivated in Britain. University Press, Oxford.
- CLEMENTS, J. B. Land use in Nyasaland. (*Institute Paper* No. 9, 1937).
 Cinyanga translation of same, published by the Government Printer, Nyasaland, under the title:
 MASAMALIDWE A NTHAKA. Mau amene anaphunzitsa pa Jeanes Training Centre mu January ndi February 1937
 Bwana J. B. Clements (Woyang'anira Mitengo mu Nyasaland).

- COLLIER, F. S., and DUNDAS, J. The arid regions of Northern Nigeria and the French Niger Colony. (*Empire Forestry Journal*, Vol. 16, No. 2, 1937, pp. 184-194).
- DADSWELL, H. E., and LANGLANDS, I. Brittle heart and its relations to compression failures. (*Empire Forestry Journal*, Vol. 17, No. 1, 1938, pp. 58-65).
- DAY, W. R. The dying of Larch. A note on Professor E. Münch's Monograph 'Das Lärchensterben.' (*Forestry*, Vol. 11, 1937).
- DAY, W. R., and PEACE, T. R. The influence of certain accessory factors on frost injury to forest trees. (*Forestry*, Vol. 11, 1937).
- DUNDAS, J. On *Acacia seyal* Delile in Nigeria. (*Chronica Botanica*, Vol. 4, 1938, pp. 28-29).
- DUNKLEY, H. L. New trees and shrubs from Tropical Africa V. (*Kew Bulletin*, 1937, pp. 466-471).
- DUNKLEY, H. L., and BULLOCK, A. A. *Canthium tophamii*. *Kew Bulletin*, 1937, pp. 420-421).
- EGGELING, W. J. The savannah and mountain forests of South Karamoja, Uganda. (*Institute Paper* No. 11, 1938). *Out of print*.
- ELLIOT, C. SIBLEY. A decade of progress in kiln seasoning in Australia. (*Empire Forestry Journal*, Vol. 17, No. 1, 1938, pp. 84-87).
- GAY, W. The School Endowment Plantation Scheme in Victoria, Australia. (*Empire Forestry Journal*, Vol. 17, No. 1, 1938, pp. 66-69).
- GRASOVSKY, A. A world tour for the study of soil erosion control methods. (*Institute Paper* No. 14, 1938).
- MOOR, H. W. Vegetation and climate. (*Empire Forestry Journal*, Vol. 16, No. 2, 1937, pp. 200-214).
- PEACE, T. R. Butt rot of conifers in Great Britain. (*Quarterly Journal of Forestry*, Vol. 32, No. 2, 1938, pp. 81-91).
- ROSEVEARE, D. R. Forest conditions of the Gambia. (*Empire Forestry Journal*, Vol. 16, No. 2, 1937, pp. 217-226).
- SANZEN-BAKER, R. G. Literature on the Mistletoes. (*Institute Paper* No. 12, 1938).
- STEVENSON, N. S. The evolution of vegetation survey and rural planning in British Honduras. (*Empire Forestry Journal*, Vol. 17, No. 1, 1938, pp. 9-26).
- TROUP, R. S. Forestry and reforestation. (*Contribution to Encyclopaedia Britannica Year Book*, 1938).

APPENDIX V.

SPECIMENS RECEIVED, 1937-38.

HERBARIUM.

EUROPE. *The British Isles*: Various correspondents, 84; the Forest Products Research Laboratory, Princes Risborough, 185; the Director, Royal Botanic Gardens, Kew, 22; Dr. J. Burtt Davy, 6; Mr. T. R. Peace, 1. *Cyprus*: The Conservator of Forests, Nicosia, 21; Mr. A. Foggie, through the Regius Keeper, Royal Botanic Gardens, Edinburgh, 5. *Finland*: Mr. W. R. Day, 10.

ASIA. *British North Borneo*: The Conservator of Forests, through the Director, Royal Botanic Gardens, Kew, 29. *Burma*: Through the Forest Products Research Laboratory, Princes Risborough, 3. *Federated Malay States*: Mr. C. F. Symington, 1. *India*: Mr. C. E. Parkinson, 2.

AFRICA. *Bechuanaland*: Mr. O. B. Miller, 331. *Gold Coast*: The Conservator of Forests, Accra, through Mr. J. E. Andoh, 13; Mr. C. Vigne, 1. *Hadramaut, S. Arabia*: Miss E. W. Gardner, 30. *Kenya Colony*: The Conservator of Forests, 80. *Nigeria*: The Chief Conservator of Forests, 5; Senior Assistant Conservator of Forests, Bornu Forest Circle, 2; Assistant Conservator of Forests, Cameroons Circle, 42; Assistant Conservator of Forests, i/c Silviculture, Ibadan, 8; Assistant Conservator of Forests, Working Plans and Research Circle, Ibadan, 2; Mr. J. D. Kennedy, 47; Mr. R. A. Sykes, through the Forest Products Research Laboratory, Princes Risborough, 4. *Nyasaland*: The Conservator of Forests, Zomba, 8; Mr. P. Topham, 33; Mr. R. G. Ross Townsend, 40. *Northern Rhodesia*: Mr. C. E. Duff, 102; Mr. R. G. Miller, 101; Mr. J. D. Martin, 93. *Southern Rhodesia*: The Conservator of Forests, Salisbury, 194; Mr. H. Boyd Gilliland, 76. *Sierra Leone*: Mr. T. E. Edwardson, 375; Mr. R. S. Pelly, 51. *Swaziland*: Mr. O. B. Miller, 83. *Tanganyika Territory*: The Conservator of Forests, 56; Mr. B. D. Burtt, 19, through the Director, Royal Botanic Gardens, 24; Mr. P. J. Greenway, 4; Mr. H. A. Lindeman, 19; Mrs. J. H. Vaughan, 14; through the Forest Products Research Laboratory, Princes Risborough, 2. *Uganda*: The Conservator of Forests, Entebbe, 53. *Union of South Africa*: The Director of Forests, Department of Agriculture and Forestry, Pretoria, 6; the Principal Botanist, Division of Plant Industry, Department of Agriculture and Forestry, 23; Miss M. Wilman, 16. *Zanzibar*: Mrs. J. H. Vaughan, 6.

AMERICA. *United States*: Dr. W. R. Maxon, Smithsonian Institution, Washington, D.C., 79; Miss Spencer, 625. *Trinidad*: The Director, Department of Agriculture, 3; Conservator of Forests, 1.

AUSTRALASIA. *New Zealand*: Mr. G. T. S. Baylis, 7.
Total: 3,047.

WOOD COLLECTION.

Hand Specimens for Type Collection.

EUROPE. *The British Isles*: School of Forestry, Cambridge, through the Forest Products Research Laboratory, Princes Risborough, 147; the Forest Products Research Laboratory, Princes Risborough, 22; the Colonial Forest Resources Development Department, 8; Mr. J. Parkin, 1; Dr. J. Burt Davy; Mr. E. W. Jones, 2. *Finland*: Mr. W. R. Day, 2.

ASIA. *Ceylon*: The Conservator of Forests, through Mr. C. P. Jayawardana, 6. *Fiji*: Mr. B. E. V. Parham, 6. *Java*: The Director, Boschbouwproefstation, Buitenzorg, 115; Dr. L. Chalk, 10. *Malaya*: The Forest Research Institute, Képong, 1.

AFRICA. *Cameroons*: The Director, Royal Botanic Gardens, Kew, 31. *Nigeria*: The Conservator of Forests, through Mr. W. G. Cameron and Mr. W. A. Fairbairn, 45. *Portuguese West Africa*: Mr. W. A. Exell, British Museum, 7. *Sierra Leone*: The Conservator of Forests, through Mr. T. E. Edwanson, 137.

AMERICA. *Brazil*: Ministerio da Agricultura, 50. *British Honduras*: The Conservator of Forests, 102. *Trinidad*: The Conservator of Forests, 72. *U.S.A.*: U.S. Dept. Agric., through Dr. H. L. Shantz, 4; Mr. W. J. Field, 22; Mr. L. R. Kische, 26; Professor S. J. Record, 1; Mr. Milton Scott, 74.

Total: 896.

APPENDIX VI.

HERBARIUM EXCHANGES, 1937-38.

	Duplicates despatched.	Duplicates received.
Arnold Arboretum (Dr. A. Rehder) ...	120	—
British Museum (Dr. J. Ramsbottom) ...	77	—
Czecho-Slovakia, Národní Museum, Botan- ické odděl (Dr. I. Kláštersky) ...	400	—
Holland, Botanisch Museum en Herbari- um (Dr. A. J. Kostermans)	50	—
Kew, Royal Botanic Gardens (Sir Arthur W. Hill)	183	75
Pretoria, Division of Botany, Department of Agriculture and Forestry (Dr. I. B. Pole Evans)	—	23
Wales, University College of North Wales (Prof. D. Thoday)	92	—
Washington, D.C., The Smithsonian In- stitution (Dr. W. R. Maxon)	—	79
Yale University, School of Forestry (Prof. S. J. Record)	100	—
	<hr/> 1,022 <hr/>	<hr/> 177 <hr/>

PUBLICATIONS ISSUED BY THE IMPERIAL
FORESTRY INSTITUTE.

OXFORD FORESTRY MEMOIRS.

1. The Relation between Height Growth of Trees and Meteorological Conditions. By W. E. Hiley and Norman Cunliffe. 1922. 3s. 6d.
2. Soil Acidity and its Relation to the Production of Nitrate and Ammonia in Woodland Soils. By G. R. Clarke. 1924. 3s. 6d.
3. The Watermark Disease of the Cricket-bat Willow (*Salix caerulea*). By W. R. Day. 1924. 3s. 6d.
4. Measurements of the Cubical Contents of Forest Crops. By M. D. Chaturvedi. 1926. 10s. 6d.
5. The Physiography of Southern Nigeria and its Effect on the Forest Flora of the Country. By J. R. Ainslie. 1926. 4s. od.
6. The Financial Return from the Cultivation of Scots and Corsican Pines. By W. E. Hiley. 1926. 3s. 6d.
7. The Gold Coast Forest: A Study in Synecology. By T. F. Chipp. 1927. 10s. od.
8. The Forest Industry of Finland. By W. E. Hiley. 1928. 4s. 6d.
9. Aerial Survey in Relation to the economic Development of new Countries, with special Reference to an Investigation carried out in Northern Rhodesia. By R. Bourne. 1928. 7s. 6d.
10. Formation of Spring and Summer Wood in Ash and Douglas Fir. By L. Chalk. 1930. 6s. od.
11. Studies of the Sirex Parasites. By R. N. Chrystal. 1930. 5s. od.
12. The Plasticity of the Root System of Corsican Pine in early Life: Researches designed to facilitate the Establishment of this Tree in Great Britain. By R. N. Aldrich-Blake. 1930. 6s. od.
13. Regional Survey and its Relation to Stocktaking of the Agricultural and Forest Resources of the British Empire. By R. Bourne. 1931. 15s. od.
14. The Fixation of atmospheric Nitrogen by Bacteria living symbiotically in Root Nodules of *Casuarina equisetifolia*. By R. N. Aldrich-Blake. 1932. 3s. 6d.

15. *Meria laricis*, the Leaf-Cast Disease of Larch. By T. R. Peace and C. H. Holmes. 1933. 4s. *od.*
16. The Experimental Production and the Diagnosis of Frost Injury on Forest Trees. By W. R. Day and T. R. Peace. 1934. 6s. *od.*
17. The Physiography and Vegetation of Trinidad and Tobago. A Study in Plant Ecology. By R. C. Marshall. 1934. 6s. *od.*
18. The Silviculture of the Mixed Deciduous Forests of Nigeria. By W. D. MacGregor. 1934. 15s. *od.*
19. The Use and Misuse of Land. By R. MacLagan Gorrie. 1935. 6s.

OXFORD MANUALS OF FORESTRY.

Silvicultural Systems. By R. S. Troup. 1928. 21s.

The Economics of Forestry. By W. E. Hiley. 1930. 21s.

FOREST TREES AND TIMBERS OF THE BRITISH EMPIRE.

1. Some East African Coniferae and Leguminosae. By L. Chalk, J. Burt Davy and H. E. Desch. 1931. 5s.
2. Twenty West African Timber Trees. By L. Chalk, J. Burt Davy, H. E. Desch and A. C. Hoyle. 1933. 7s. 6d.
3. Fifteen South African High Forest Timber Trees. By J. Burt Davy, L. Chalk, M. M. Chattaway, F. S. Laughton and M. H. Scott. 1935. 7s. 6d.

CHECK-LISTS OF THE FOREST TREES AND TIMBERS OF THE BRITISH EMPIRE.

1. Uganda Protectorate. By J. Burt Davy and F. Bolton, with the collaboration of N. V. Brasnett, W. J. Eggeling and C. M. Harris. 1935. 5s. (*Out of print.*)
2. Nyasaland Protectorate. By J. Burt Davy, J. B. Clements, P. Topham and R. C. Ross Townsend. 1936. (*Out of print.*)
3. Draft of the First Descriptive Check-List of the Gold Coast. Compiled by Members of the Gold Coast Forest Department and revised by the Staff of the Imperial Forestry Institute herbarium. 1937. 5s. (*Out of print.*)

MISCELLANEOUS.

The Silviculture of Indian Trees. By R. S. Troup. 1921. 3 volumes. 105s.

- A Manual of the Flowering Plants and Ferns of the Transvaal, with Swaziland, South Africa. By J. Burt Davy. Part I, 1926. 15s. Part II, 1932. 25s.
- Handbook of Conifers grown in the Arboretum, Bagley Wood, Oxford. By J. Burt Davy. 1926. 2s.
- Collection and Preparation of Herbarium and Timber Specimens. By J. Burt Davy and L. Chalk. 1928. 8d.
- Engineering for Forest Rangers in Tropical Countries, with special reference to Burma. By A. H. Lloyd. 1929. 17s. 6d.
- British Hardwoods: their Structure and Identification. By L. Chalk and B. J. Rendle. 1929. (Issued by the Forest Products Research Laboratory, Princes Risborough, as Forest Products Research Bulletin No. 3). 5s..
- Exotic Forest Trees in the British Empire. By R. S. Troup. 1932. 20s.
- Natural Woodlands of Britain and Ireland. By M. L. Anderson. 1932. 9d.
- International Classification System for Forest Bibliography with the Index Number 634.9F. International Union of Forest Research Organizations. English translation. 1936. 6s.
- Forest Bibliography to 31st December, 1933. Part I (1, General Silviculture, and 2, Seed and Seedlings). 1936. 5s. Part II (3, Natural Reproduction; 4, Artificial Reproduction; 5, Tending; 6, Silvicultural Systems; 7, Notes on Trees). 1937. 12s. 6d. Part III (Forest Protection: 1, Man; 2, Animals; 3, Atmospheric Influences; 4, Fire; 5, Weeds; 6, Other Agencies; 7, Fencing). 1938. 12s. 6d. Part IV. (Forest Utilization) ready shortly. Other parts in preparation.
- The Study of the Soil in the Field. By G. R. Clarke. Second edition. 1938. Clarendon Press, 6s.
- Insects of the British Woodlands. By R. N. Chrystal. 1937. 7s. 6d. Warne.
- The Black Poplars and their Hybrids cultivated in Britain. By G. S. Cansdale and members of the staff of the Imperial Forestry Institute. 1938. 3s. 6d.
- Forestry and State Control. By R. S. Troup. 1938. 3s. 6d. Clarendon Press.

